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DEMERSAL FISH (NORTHERN) COMMITTEE

by A. Meyer

1970

Belgium

(P. Hovart)

The stock analysis by means of market sampling and of research vessel catches was continued. Age, length, weight, sex and stage of maturity of cod, whiting, plaice and sole were determined.

Eight hundred cod were tagged in the Central North Sea, as well as 700 cod, 500 soles and 500 plaice off the Belgian coast.

The distribution and abundance of spawning roundfish and flatfish was studied by means of young fish surveys off the Belgian coast.

A special study has been carried out on the biological parameters of the year class 1969 of cod.

Canada

(W. Templeman and F.D. McCracken)

Routine size, age, maturity and in some cases fecundity sampling of landings from ICNAF Subareas 2-5 were continued in 1970. Research vessel surveys were also carried out over most of these subareas. In Subareas 4 and 5 these surveys were coordinated with comparable efforts by the USA and the USSR and formed part of an international demersal fish survey programme extending from the Gulf of St Lawrence to Cape Hatteras. The surveys provide estimates of pre-recruit year class strengths for major commercial species.

Cod

The inshore Labrador cod fishery was extremely poor, and low coastal catches were also taken in north-eastern Newfoundland. In an offshore survey on Hamilton Inlet Bank off southern Labrador, the 1967 year class appeared to be successful. A survey cruise of the eastern Grand Bank in ICNAF Division 3N and to St Pierre Bank, Division 3Ps, indicated that the 1966 and 1968 year classes are fairly strong and the 1967 year class weaker. Virtual population analyses for assessment purposes have been carried out on cod of ICNAF Divisions 2J, 3K and 3L.

Cod of 4 and 5 years of age continued to make up the bulk of landings from Div. 4T. The autumn trawl survey indicated adequate recruitment to the 1971 fishery.

Analysis of the Div. 4X (Browns-LaHave Banks) cod fishery indicated that the rapid increase in landings in the 1960's resulted mainly from development of an offshore Canadian otter-trawl fishery. In 1965-69, landings were predominantly fish of 40-80 cm, aged 3-6 years. The constant parameter yield-per-recruit model indicates that the level of fishing mortality (F = 0.70) in 1965-69 was considerably above that giving the maximum sustainable yield-per-recruit.

Haddock

On the southern Grand Bank, the adult stock of haddock is at a very low level with only very low commercial landings. Survey cruises indicate that most recent year classes up to 1968 have been poor. On St Pierre Bank from which recent landings have improved a little because of some success of the 1966 year class, the 1967 and 1968 year classes appear to be poor and the 1969 year class probably a fairly good one.

Recruitment of haddock to the fisheries of ICNAF Subarea 4 has been poor since the good year class of 1963. Pre-recruit surveys in 1970 gave no indication of significant improvement.

Analysis of the haddock stock and fishery in Div. 4V-W indicates that the total population available to the fishery will decline still further (assuming that fishing mortality remains around F = 0.50). The data suggest a stock of about 25 million haddock in 1969, declining to 20 million in 1972, and probably yielding from 9 - 12 thousand metric tons.

Most recent studies of the Div. 4X haddock stocks indicated that the ICNAF annual quota of 18 000 metric tons for this area in 1970-72 is much too high to prevent serious stock decline. However, it should be noted that, in 1970, with a closed period in March and April, total landings from Div. 4X were not more than about 12 000 tons.

Flatfish

Total mortality rates (Z) for American plaice (long rough dab) were calculated to be :

North-east Grand Bank, males	1955-56 : 0.35;	1967-68 : 0.60;
North-east Grand Bank, females	1955-56 : 0.19;	1967-68 : 0.45;
South-east Grand Bank, males	1957-58 : 0.36;	1965-66 : 0.67;
South-east Grand Bank, females	1957-58 : 0.21;	1965-66 : 0.44.

Estimates of natural mortality were 0.24 and 0.30 for males and 0.14 and 0.18 for females of these two areas respectively.

Of 238 Greenland halibut tagged in October 1969 near the entrance to White Bay, Newfoundland, 5 were recaptured in April-May 1970 on the Continental slope north-east of Funk Island, evidently on a spawning migration to the deep water of the slope.

Silver hake, Merluccius bilinearis (Mitchill)

Studies on gill parasites in silver hake were concluded. There was no evidence that these parasites were useful as biological indicators of stock separation. A report on distribution of the parasites and their method of attachment was prepared.

Cod digestion rates

Young cod digested whole euphausiids more quickly than they digested chunks of shrimps, probably due to the smaller size of the euphausiids.

Time for cod to empty their stomachs, at three acclimation temperatures of 5, 10 and 15°C, when fed 0.4 g (dry weight) euphausiids, was 29, 15, and 13 hours respectively. When given the same weight of shrimp the times were 58, 25, and 20 hours.

Fish eggs and larvae

Field studies of recruitment of cod and other species by means of egg and larval surveys were continued in 1970, but at a reduced rate.

Denmark

(O. Bagge)

Cod

The Baltic trawlings from the "Dana" in November have shown that the 1969 year class is abundant east of Bornholm. Trawlings from a chartered cutter gave similar results in the western Baltic.
795 cod have been tagged east of Bornholm in November.

Plaice

Quantitative fishery for young plaice along the shore carried out in July and August from the motorboat "Havkatten" has shown that the year class 1970 is of medium strength in all the areas investigated.

Turbot and Brill

Turbot and brill were tagged occasionally in the Kattegat (31 turbot and 143 brill).

Sole

Current investigations are being carried out. An age-length key has been made, it shows that the year class 1966 is now dominating in the Danish sole fisheries.

Greenland

(Sv. Aa. Horsted)

Cod

Hauls with 2 m stramin nets on various sections off West Greenland showed spawning to take place as normally in April-May along the western slope of the fishing banks. In July, the traditional and best month for cod larvae investigations, the number of cod larvae found was very small; best haul revealed 12 larvae in half an hour. The very poor results of these hauls combined with the results of sea-temperature measurements indicate the 1970 cod year class at West Greenland to be a very poor one.

Pre-recruits (age groups I-III) have been sampled by various gears. The abundance of these age groups seems rather poor, especially in the southern part of West Greenland (ICNAF Div. 1F).

Commercial sized cod have been sampled, especially from landings of the new (and first) Greenland trawler. Nine samples representing approximately 500 tons (or roughly 20% of the trawler's landings in 1970) were taken. 5 900 specimens were measured and 3 200 otoliths (stratified samples) taken. From research catches and commercial catches by gears other than trawl, 6 800 specimens were measured. Of these, 3 357 otoliths were taken, mainly by stratified sampling. All samples are reported to ICNAF Sampling Yearbook.

The newly recruited 1966 year class seems rather promising in the northern regions off West Greenland, but the most important year classes in 1970 were the 1963, 1964 and 1965 year classes of which the former was expecially strong on the southern fishing banks. The year classes 1965 and 1966 seem to be the most predominating ones in 1971-72, but with a considerable catch(in weight) also of the 1963 year class, especially on the southern fishing banks in the first half of the year.

1 642 cod were tagged in 1970, of these 1 010 in the ICNAF Div. 1E and 1F from where the migration to East Greenland is predominant.

Other Gadidae

139 Gadus saida caught by research prawn trawl were measured and so were 346 Gadus ogac.

Redfish

Unfortunately cod catches in the Godthåb Fjord were so poor that the fishermen gave up the commercial pound-net fishery, from where we normally get some redfish for tagging, so that no redfish tagging could be conducted.

4 469 redfish caught by small meshed trawl (research) were measured.

Greenland halibut

639 specimens were tagged in the Godthåb Fjord. Approximately 2 700 specimens from research catches, mainly from trawl, were measured and so were about 3 300 American plaice.

France

(G. Lefranc)

Travail en mer

Le navire de recherche "Thalassa" a effectué en octobre et novembre 1970 une prospection au chalut au nord et au sud des bancs Bill Bailey et Lousy pour étudier la répartition des principales espèces en fonction de la profondeur et de la température. Cette prospection a été poursuivie au nord-ouest de l'Ecosse par 59°N et 7°W puis en Mer du Nord septentrionale où des marquages de morues ont été réalisés à des profondeurs situées entre 130 et 140 m. Des corrélations taille/poids ainsi qu'une répartition des tailles ont été faites pour le merlan, l'églefin et le lieu noir pêchés sur Fladen et sur Bressay.

Travail au laboratoire

Morue. Les relevés statistiques concernant les apports des bateaux travaillant dans le centre et le sud de la Mer du Nord sont poursuivis régulièrement et permettent d'apprécier la composition en tailles et en âges de ces stocks. L'examen des contenus stomacaux est continué.

Eglefin. Une étude biologique des captures d'églefin provenant de chacun des trois secteurs de la Mer du Nord a été commencée en Janvier 1970.

Merlan. Des observations effectuées sur des échantillons en provenance du sud de la Mer du Nord ont porté sur la composition en tailles et en âges, la maturité sexuelle et le contenu stomacal; par ailleurs, les rayons des nageoires et les branchiospines ont été dénombrés. Toutes ces données complétant celles déjà acquises depuis la fin de 1967 vont permettre de définir prochainement la croissance et la biométrie de ce stock méridional de merlan.

Germany

(A. Meyer)

Continuation of the biological studies at sea (research ships, factory trawlers) and at the markets with length measurements, otoliths sampling, maturity and food on :

Cod : Baltic Sea (2 000 taggings), North Sea (575 taggings, 4 550 measurements, 3 032 otoliths), Iceland (281 blood samples, 262 taggings), Greenland (sampling of roe for egg counting), Norwegian coast, Bear Island and Barents Sea. 42 547 length measurements, 12 860 age determinations and 1 726 maturity studies were carried out on the northern Atlantic cod stocks.

Haddock. North Sea (13 265 measurements, 3 098 otoliths), Iceland and Norwegian Coast (8 275 measurements, 3 198 otoliths).

Saithe. Iceland, Faroes, Norwegian Coast (25 305 measurements, 9 370 otoliths).

Redfish. Iceland, Greenland, Norwegian Coast, further studies on ageing techniques.

Whiting. North Sea (8 609 measurements, 1 091 otoliths).

Sole. North Sea

Plaice. North Sea (1 423 taggings), Baltic Sea (700 taggings).

Flounder. Baltic Sea (700 taggings).

Research trips for demersal fish

a) "Anton Dohrn"

January : North Sea (cod, haddock, whiting).
March : Iceland-East Greenland (cod, haddock, saithe, redfish).
April-May : Baltic Sea (cod, flatfish).
July : North Sea, Ireland (cod, haddock, whiting).
October-November : Norwegian Coast, Bear Island (cod, saithe, redfish, haddock).
December : North Sea, Channel (cod, haddock, whiting).

b)"Walther Herwig"

March-April : Greenland (cod, redfish).

Iceland

(J. Jónsson)

Cod and haddock were the main commercial species sampled from research vessel and commercial catches.

Otoliths were taken from 13 494 cod and these fish were also analysed with regard to length, sex and maturity. 41 782 were measured for length only and 4 441 were tagged at various localities round Iceland.

Samples for blood analysis were taken from 480 cod, mainly during the spawning season.

Otoliths, length, sex and maturity were recorded for 2 583 haddock and 4 256 measured for length.

Investigations on catfish were also carried out. Otoliths were taken from 600 fish and 589 were tagged at various localities.

Besides this, measurements and/or otoliths were taken from 28 other species for general ichthyological work.

Ireland

(A.E.J. Went)
(D. de G. Griffith)

Research vessel cruises were made to investigate the distribution of plaice eggs in the northern part of the Irish Sea, and to carry out mesh selection experiments with trawled plaice (Pleuronectes platessa).

Netherlands

(P. Korringa)

Work at Sea

The RV "Tridens" made 17 cruises in the Committee's area of which 11 were mainly or partly devoted to work within the scope of the Demersal Fish (Northern) Committee.

The corresponding number of cruises made by RV "Willem Beukelsz" were 26 and 10.

On board commercial cutters the destruction of demersal fish (undersized and sized) was assessed during 11 cruises.

The RV "Tridens", "Willem Beukelsz", "Schollevar","Waddenzee" and "Stern" made two joint cruises (in spring and in autumn) to analyse the stocks of juvenile sole, plaice, dab, flounder, gadoids, shrimps and other organisms in the nurseries of Holland, Germany and Denmark, in cooperation with the Belgian research cutter "Hinders" doing the Belgian coast and the German commercial cutter "Büsum 45" working in the Sylt area.

Work on Fish

Plaice : The stock analysis by means of market sampling was continued.

Sole : The stock analysis by means of market sampling and racial investigations on sole from different localities in the North Sea and the Liverpool Bay was continued. An analysis of the catches of undersized sole in the Dutch, German and Danish coastal areas on a standard network of stations was made in order to be able to predict commercial catches.

Turbot and Brill : Occasionally turbot and brill were tagged during all cruises in which bottom trawls were used.

Cod : 3 000 cod and codlings were tagged in the North Sea. Young roundfish surveys were made in February and June.

Cod, haddock and whiting : The stock analysis by means of market sampling was continued.

Norway

(A. Hylen)

Routine sampling of Norwegian landings of cod, haddock, coalfish, redfish and Greenland halibut from the north-east Atlantic was carried out at some of the principal ports along the coast. A total of 110 000 fish were measured and 30 000 otoliths were collected. In addition, Lofoten was sampled by a hired purse-seiner in March/April for spawning cod and by a hired Danish-seiner in September for immature cod and haddock.

Cod and haddock samples were collected along the Finnmark coast in May by RV "Johan Hjort" and in September by a hired Danish-seiner. The Barents Sea, the Bear Island and the Spitsbergen area were sampled by RV "G.O. Sars" in November for cod, haddock, redfish and Greenland halibut. In addition, some species without commercial value were studied and some effort was diverted to a study of the diet of the most abundant fish species in the area.

Blood samples of cod and redfish were collected in the Barents Sea, Bear Island and Spitsbergen area in order to analyse the genetic composition of the stocks.

Taggings of spawning cod caught by purse-seine were carried out during March/April in Lofoten and immature cod and haddock caught by Danish-seine and coalfish by purse-seine were tagged in August/September in coastal areas from Lofoten to Vardø.

Routine echo surveys in Lofoten were carried out by RV "Peder Rønnestad" in February, just prior to the spawning of Arctic cod, and the Finnmark coast area and the southern Barents Sea were surveyed in May by RV "Johan Hjort".

A study of the abundance and the distribution of cod eggs and larvae in the Lofoten-West Finnmark area was carried out in March/May by the research vessels "Asterias", "G.O. Sars" and "Johan Hjort". This investigation was followed by the 0-group fish survey during August/September in the Barents Sea, Bear Island and Spitsbergen area, this year carried out by the research vessels "G.O. Sars" and "Johan Hjort", in cooperation with two Soviet vessels. Further studies of the distribution and the abundance of 0-group fish were made in November by RV "G.O. Sars".

Poland

(B. Draganik)

Baltic

Cod. In 1970 samples were taken from the commercial catches in the Southern Baltic for determination of size, weight, sex, stage of maturity and age composition.

In all 16 190 cod the length was measured and the age of 4 853 specimens determined.

Quantitative catches of juvenile cod were carried out with a standard trawl. The catches were made in the Bay of Gdańsk in the southern part of the Bornholm Basin. 52 hauls were made and 5 142 specimens were caught.

Age estimates were made on otoliths taken from 319 specimens.

Flatfish. As usual, data were collected on landings of the Polish flatfish catches in the Baltic. In 15 samples taken from the Bay of Gdańsk and 9 samples from the Bornholm Basin, the length of 5 546 flounders and 1 001 plaice was measured; 2 980 flounders and 1 001 plaice were investigated for weight, age composition and sexual maturity.

North Sea

The data collected are shown in Table 1 :

Species	Number of Fish	
	Length measured	Analysed
Haddock	2 029	505
Saithe	100	100
Total	2 129	605

Celtic Shelf

The data collected are shown in Table 2 :

Species	Number of Fish	
	Length measured	Analysed
Cod	125	50
Haddock	4 401	1 092
Whiting	1 306	401
Hake	491	100
Total	6 323	1 643

Barents Sea

The data collected are shown in Table 3

Species	Number of Fish	
	Length measured	Analysed
Cod	19 232	1 567
Saithe	1 098	100
Greenland Halibut	3 137	205
Long Rough Dab	599	100
Redfish	6 763	431
Total	30 829	2 403

Portugal

No report received

Spain

(O. Cendrero)

No investigations to be reported for 1970.

Sweden

(G. Otterlind)

The international cod tagging programme was continued in the Baltic. A total of 4 636 cod were marked with Lea tags (2 150) and Spaghetti tags (2 486). These experiments were performed from the Gotland area in the North to the Arkona Basin in the South. Outside the Baltic 250 cod were tagged in the Sound and 500 in the southern Kattegat (all with Lea tags). The working up of the material from the Baltic experiments is now planned in accordance with recommendations from the Working Group on Assessment of Demersal Fish Stocks in the Baltic. As in previous years, the recruitment of the Baltic cod has been investigated on catches of young fish caught with the fine meshed standard trawl. Samples of cod eggs and larvae have been collected and investigations into the bottom fauna and feeding habits of the cod have been continued. Analyses of chlorinated hydrocarbons in Baltic fish showed high residue values, especially for DDT in cod liver. As a consequence of that the marketing of liver from cod caught in the entire Baltic Sea was banned by the Swedish authorities in February 1971.

United Kingdom

1. England and Wales

(M.J. Holden)

Region 1 Fisheries

Stock assessment programmes have continued. In this connection, RV"Ermest Holt", with Icelandic and German research vessels, took part in a second survey of the blood and serum characteristics of the cod spawning off west Iceland, as part of the international programme to estimate the proportion of cod of Greenland origin present in the spawning cod fishery at Iceland. The preliminary results of this programme have been reported

to the North-Western Fisheries Working Group. Unfortunately, the delays in bringing into service of the new RV "Cirolana" prevented English participation in 0-group surveys in 1970, but it is intended to rejoin these programmes in the Barents Sea and at Iceland in 1971.

Region 2 Fisheries

The results of stock analyses, including tagging experiments, have been collated and contributed to the appropriate North Sea Working Group. These and broad ecological programmes on the interrelation between plaice and dab have been continued and additional projects initiated with regard to mixed inshore demersal fisheries off the south-west coast and in the Irish Sea.

Egg and larval surveys in the southern North Sea in the early part of the year were continued together with complementary studies of the biology of juvenile plaice in the inshore zone.

The programme of sampling commercial landings of demersal species has been maintained with slight adjustments to improve coverage of west coast fisheries. The composition of freezer trawler landings are now being monitored at processing plants by sampling prior to filleting, and automatic fishing time recorders are being installed in this class of vessel to improve the precision of fishing effort statistics.

Fish tagged in connection with these various programmes were as follows :

Species	ICES DIVISION				
	IV		VIa	VII	
	b	c		a	d/e
Cod	-	-	256	362	10
Haddock	-	-	-	-	10
Plaice	1 027	23	-	-	4 913
Dover Sole	-	-	-	-	1 438
Lemon Sole	-	-	-	-	1 099
Dab	262	3	-	-	-
Spurdog	44	-	-	-	-
Tope	-	-	-	-	-
Ray	-	373	-	-	-
Bass	-	-	-	-	88

2. Scotland

(R. Jones)

Trawling surveys were made in the North Sea, on Rockall Bank, at the Faroes and in the Faroe/Iceland area by Scottish research vessels to provide length and age composition data of the major species and to obtain pre-recruit estimates of the year class strengths of haddock, whiting and Norway pout. 0-group gadoids were sampled in the North Sea by FRS "Scotia" in June and July using a pelagic trawl. Older fish were sampled, using a bottom trawl, in the North Sea in April/May by FRS "Scotia" and at the Faroes by FRS "Explorer" in June. In addition, FRS "Explorer" sampled in the Rockall Bank area in April and in the Faroe/Iceland area in December to investigate the distribution and abundance of blue whiting and silvery pout (Gadiculus argenteus) and their availability to capture by bottom and pelagic trawl.

Flatfish pre-recruit surveys were carried out off the Scottish east coast in June/July.

Cod, haddock, whiting, saithe, plaice, lemon sole, witches and megrims were sampled at the principal Scottish trawl and seine ports as in previous years. The fish sampled were measured and scale and otolith samples were taken for age determination. These data were used to provide forecasts for the major Scottish fisheries and formed the basis of material supplied to Annales Biologiques and ICES Statistical News Letters.

Tagging of cod, haddock, whiting, plaice and lemon sole continued in Scottish inshore waters. Further attempts were made to improve the survival rate of fish on tagging. This was done by tagging underwater and by modifying the cod-end and extension piece of the trawl to reduce the "fatigue Factor" in trawl caught fish.

Further work was carried out on the sensitivity of fish to different frequencies of sound.

Aquarium studies were continued on the efficiency of food conversion in gadoids, with particular reference to the ratio of growth in length to growth in other body proportions.

Investigations of the potential use of plaice parasites as biological indicators was continued, with the intention of enabling adult stocks of plaice to be traced to their nursery grounds. A further survey of the occurrence of a tapeworm larva in the 1967 year class of North Sea whiting was carried out and confirmed earlier results on the distribution of stocks characterised by different levels of infestation.

A survey for Norway pout larvae was conducted in late April to investigate the distribution of the spawning products of this species.

U.S.S.R.

(G. V. Nikolsky)

As in previous years, the Polar Research Institute of Marine Fisheries and Oceanography collected data to determine the abundance, size-age composition and distribution of cod, haddock, redfish, Greenland halibut and other demersal species. The volume of the material collected by separate areas is expressed in figures which are given in Tables 1 - 2. Material collected by ships which are still at sea, is not included in the Tables.

In 1970, work was conducted aiming at a more exact evaluation of the state of stocks of main commercial fishes; conditions for survival of the young at different stages of their development were studied; ichthyoplankton was collected and analysed; fishery forecasts were worked out; the work on development of methods of forecasting was continued.

In 1971, work aiming at studying the size-age structure and abundance of commercial demersal species in the Barents Sea and off Iceland will be continued. The greatest attention will be paid to determine the reasons for fluctuation of the abundance of year classes and to the development of methods of fishery forecasting.

Table 1

Biological data related to the Barents Sea, collected and treated in 1970

Species	Mass measurements		Aged specimens				Fat Content	Field analysis of feeding	Tagged specimens	Ichthyoplankton	
			Collected		Treated					No. of samples	
	Adults	Juveniles	Adults	Juveniles	Adults	Juveniles				Coll.	treated
			Southern Barents Sea								
Cod	147 040	6 082	8 497	1 111	8 497	883	5 167	17 730	2 394		
Haddock	34 909	18 206	2 979	3 552	2 979	3 517	1 910	10 946	170		
Halibut	5 652	-	373	-	-	-	-	2 497	132		
Redfish	6 526	11 901	820	1 927	-	1 829	-	3 702	-		
Other sp.	39 979	-	883	-	-	-	-	4 244	-		
Total	234 106	36 189	13 552	6 590	11 476	6 229	7 077	39 119	2 696	176	176
			Bear Island - Spitsbergen area								
Cod	43 758	11 680	5 165	816	5 165	816	1 280	2 697	832		
Haddock	399	7 228	822	1 911	822	1 911	78	2 909	-		
Halibut	34 324	-	3 043	-	-	-	-	8 196	3 720		
Redfish	52 856	13 841	7 037	1 829	-	1 829	-	12 770	-		
Other sp.	27 051	-	420	-	-	-	-	2 838	-	937	
Total	158 388	32 749	16 487	4 556	5 987	4 556	1 358	29 410	4 552	937	

Table 2.

Biological data by areas of the north-western coast of Norway and Iceland, collected and treated in 1970

Species	Mass Measurements (Specimens)	Aged specimens		Fat Content (Specimens)	Field Analysis of Feeding	Tagged specimens	Ichthyoplankton	
		collected	treated				No. of samples coll.	treated
			North-western coast of Norway					
Cod	3 968	1 472	1 472	1 286	2 647	50		
Haddock	3 131	1 617	1 617	1 516	1 904	17		
Halibut	2 107	-	-	-	-	1		
Redfish	5 605	1 446	-	-	1 999	-		
Other sp.	14 115	998	-	-	1 665	156	1 716	1 716
Total	33 926	5 533	3 089	2 802	8 215	224		
			The area of Iceland					
Cod	3 140	125	125	100	936	101		
Haddock	70 506	1 628	1 628	400	4 962	14		
Halibut	8 956	197	-	-	1 338	408		
Redfish	2 287	325	-	-	837	-		
Other Sp.	16 839	519	-	-	2 903	-		
Total	101 728	2 794	1 753	500	10 976	523		

The Atlantic Research Institute of Marine Fisheries and Oceanography collected the data on the North Sea cod. The following material (Table 3) was collected for the main species :

Species	Mass Measurements (Specimens)		Aged specimens	Tagged specimens (external tags)
	From commercial trawls	From research trawls with small mesh cover		
Haddock	80 819	52 973	5 200	147
Whiting	10 797	15 917	1 800	370
Coalfish	10 822	4 618	1 300	-
Cod	800	2 344	1 200	-
Gadus esmarki	3 400	18 452	800	-

Recovery of tagged fish : 1 specimen of whiting.

Two trawl surveys for studying the productivity of the year classes of the main commercial fish species were made :

The first survey from 23 March to 19 May;
the second from 23 October to 20 December.

The investigations on haddock, whiting and coalfish will be continued in 1971. The programme provides for sampling for length and age determination and quantitative determination of young fish.

The Baltic Institute of Fisheries continued the observations on the state of cod and flounder stocks of the Baltic Sea.

The Moscow State University continued the investigations on biochemistry of the White- and Baltic Sea fluke and studying the development of the White Sea demersal fish.